



# **SNS COLLEGE OF ENGINEERING**

Kurumbapalayam (Po), Coimbatore – 641 107

**An Autonomous Institution**

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A' Grade

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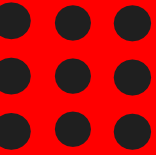
## **DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**COURSE NAME : 19EE308 ELECTRICAL ENGINEERING & INSTRUMENTATION**

**II YEAR /III SEMESTER ECE**

**Unit 1 – DC MACHINES**

**DC Motor Construction and Working principle**





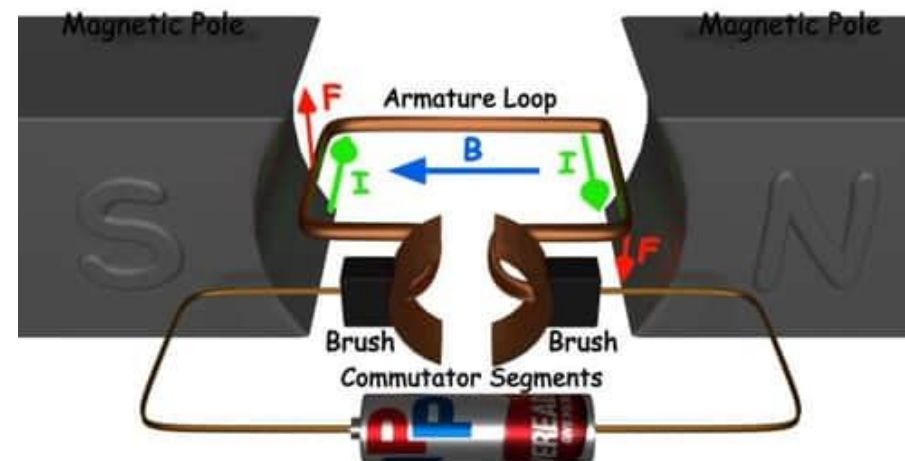
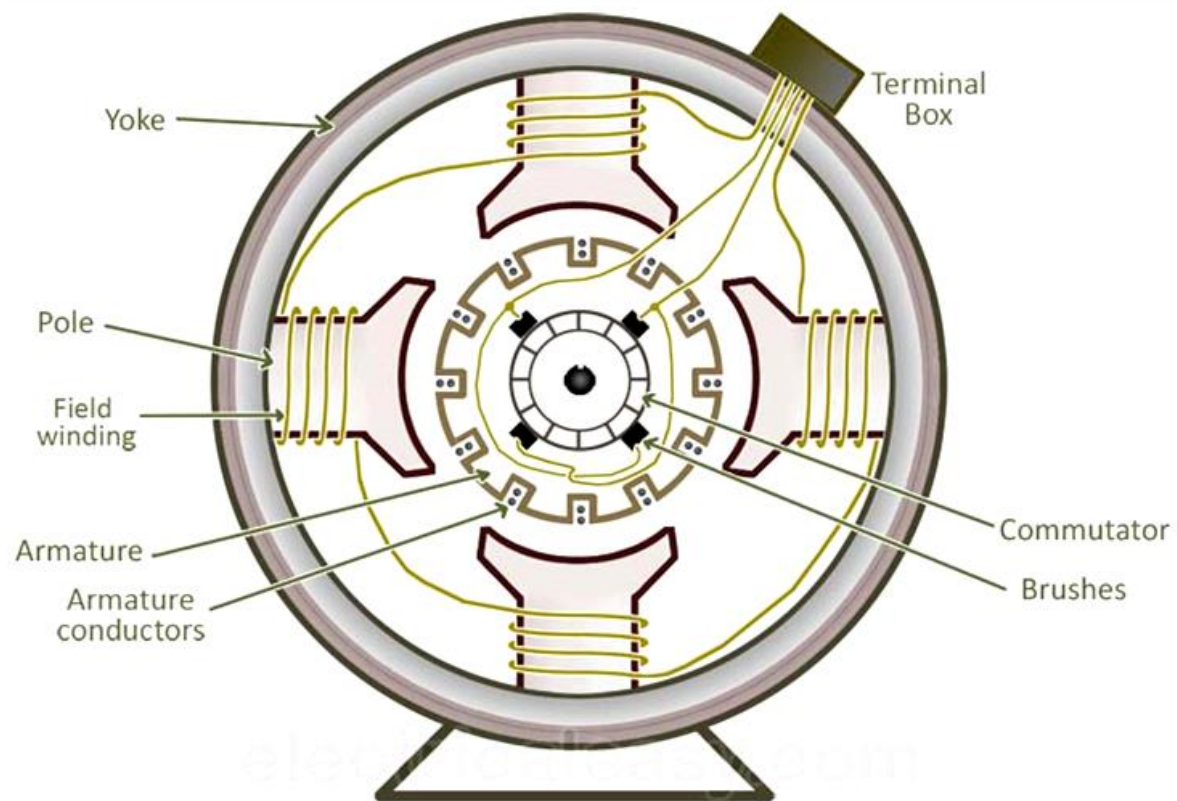
# DC MOTORS

- Why do we need motors?
- What action motor do?
- How can I create the motor?
- Why motor rotates in circular motion?



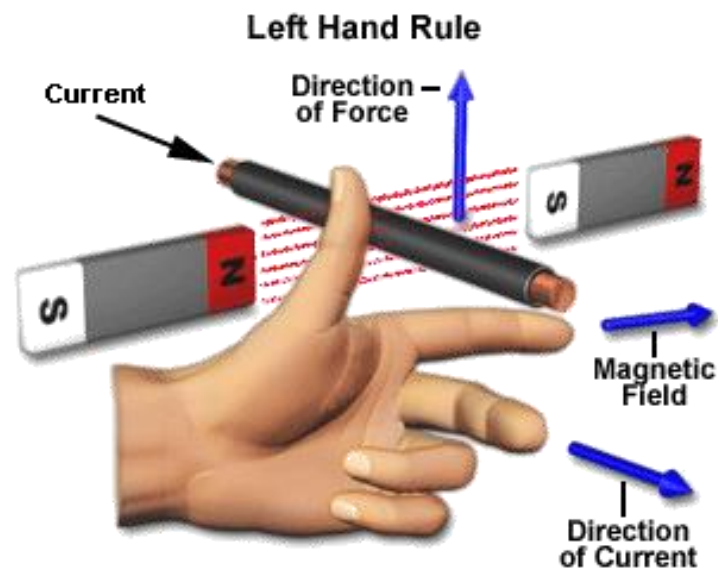
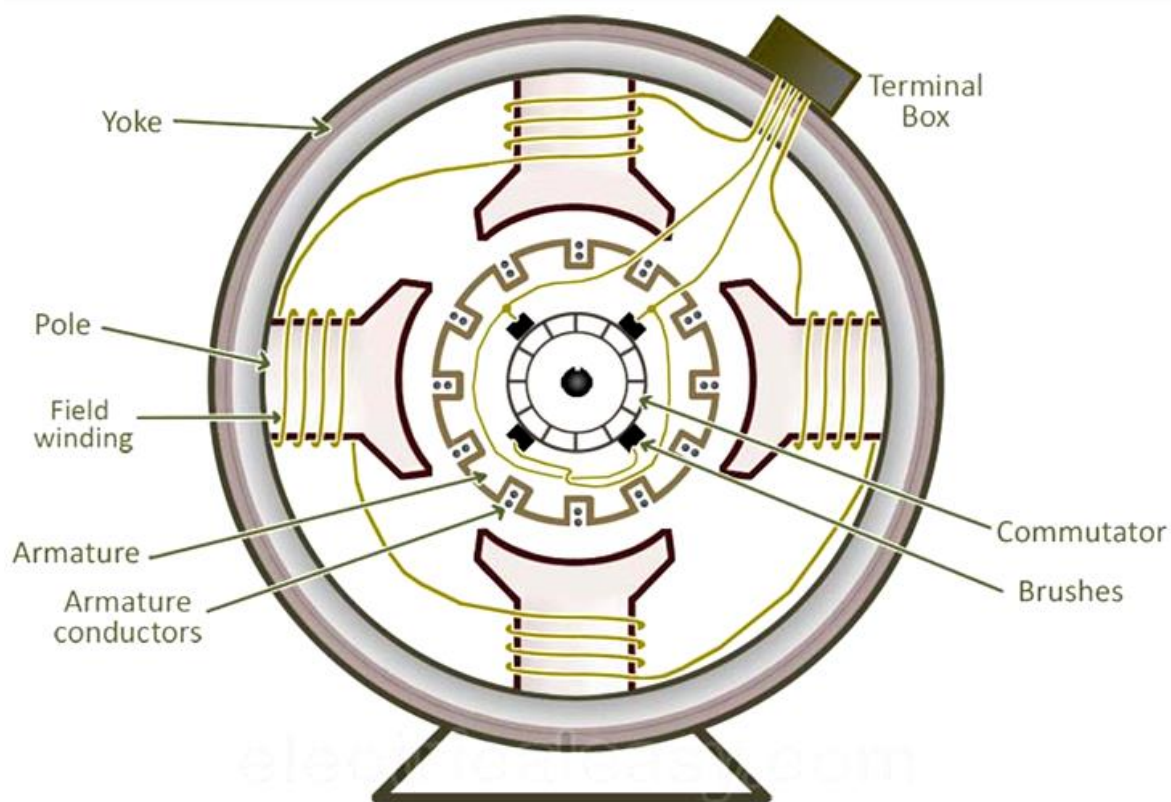


# DC MOTOR CONSTRUCTION





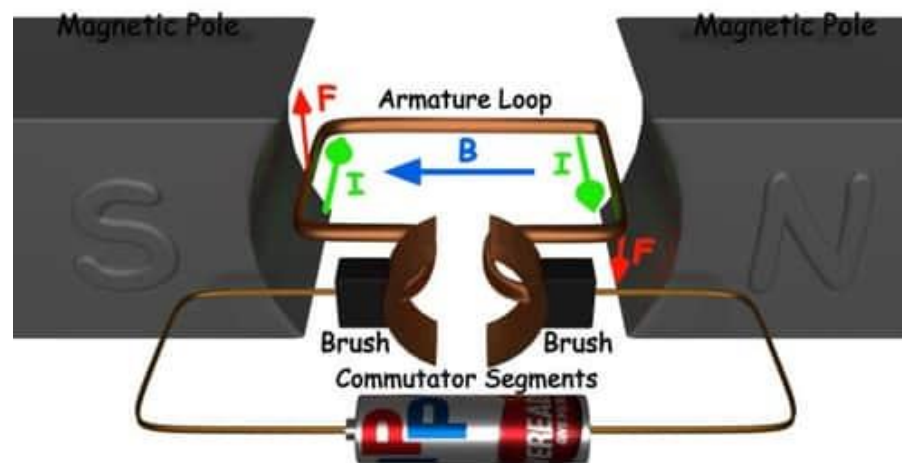
# WORKING PRINCIPLE





# MOTORING ACTION

- If a current carrying conductor is placed in a magnetic field perpendicularly, then the conductor experiences a force in the direction mutually perpendicular to both the direction of field and the current carrying conductor.





# Back EMF

When the armature of DC motor rotate in magnetic field its conductor cut by the magnetic field. According Faraday's law of electromagnetic induction EMF will be induced in armature winding the direction of EMF is reverse to the direction of armature current , its called **Back EMF**.

$$\text{Back EMF: } E_b = \frac{\phi ZNP}{60A}$$

Where,

- Z= No of conductor
- P = No of pole
- N =Speed of armature
- $\phi$  = Flux
- A = Parallel conductor for (Lap winding A=P) (Wave winding A=2)





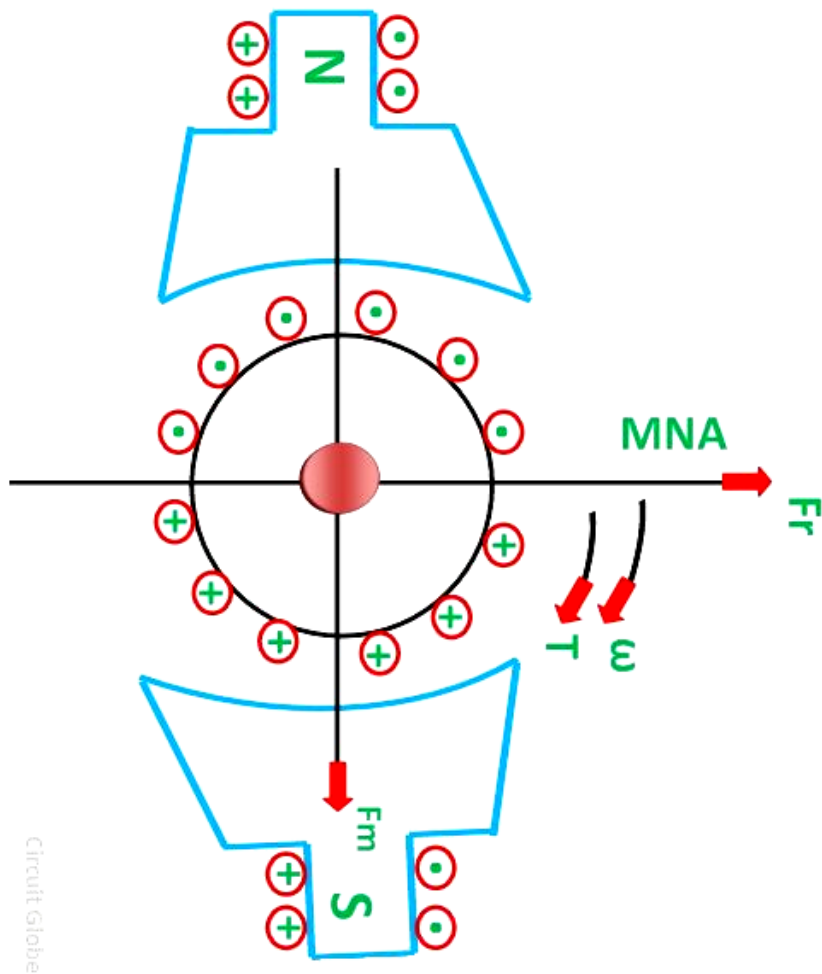
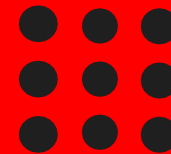
# ASSESSMENT 1

1.State the principle of DC Motor





# TORQUE PRODUCTION



Two Forces

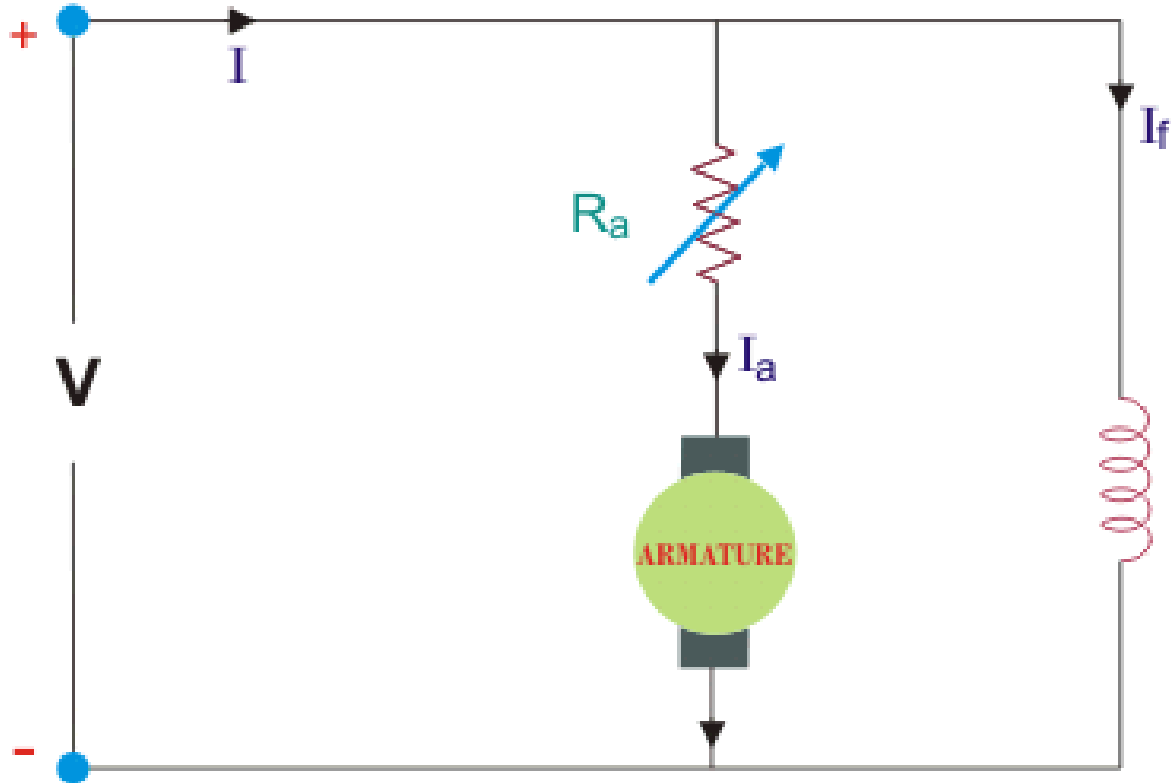
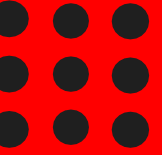
Supporting & Cancelling







# SHUNT MOTOR



Derive the voltage equation for DC Shunt Motor

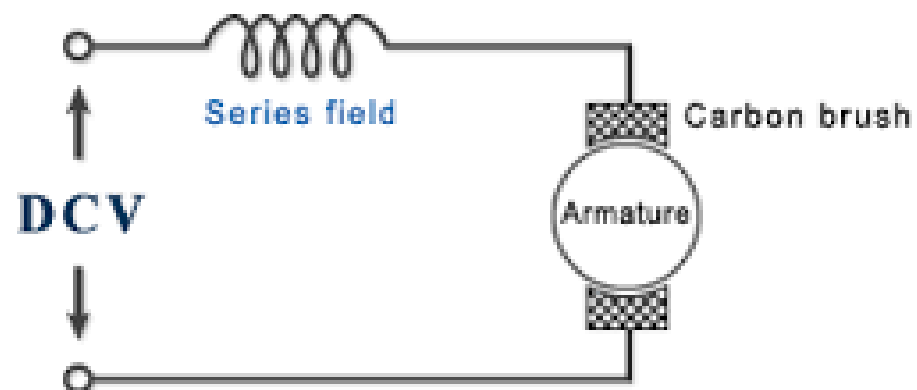




# SERIES MOTOR

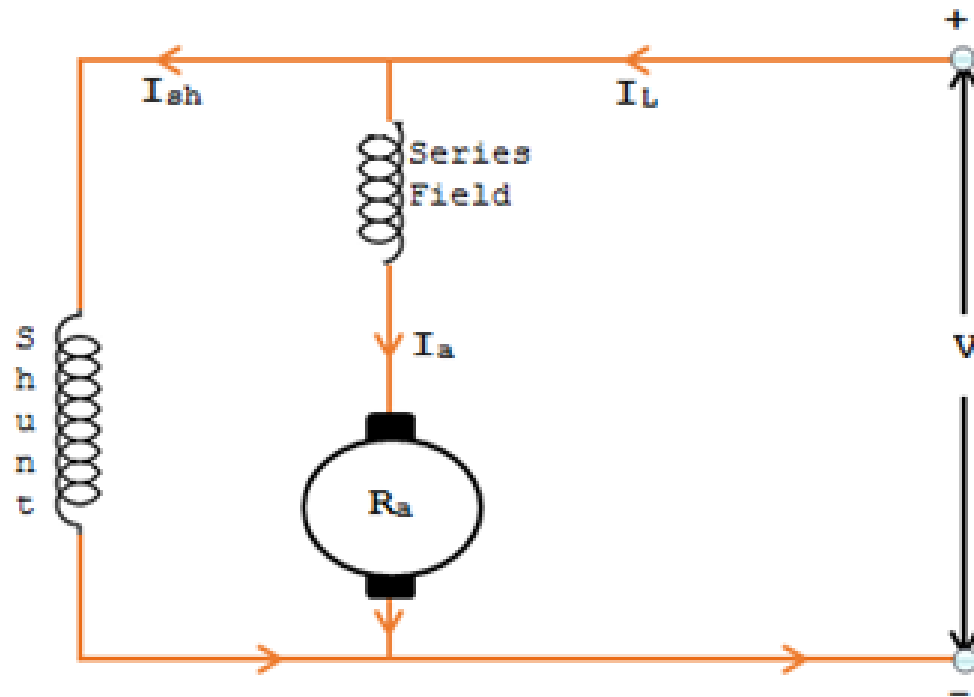
Derive the voltage equation for DC Series Motor

## ➤ Series DC motor





# COMPOUND MOTOR



Derive the voltage equation for DC Compound Motor



# Assessment 2

1. Compare DC Shunt Motor and DC Series Motor.





# REFERENCES

1. Bhattacharya. S.K, “Basic Electrical and Electronics Engineering”, Pearson Education , (2017)
2. Muthu Subramanian R, Salivahanan S,“ Basic Electrical and Electronics Engineering”, Tata McGraw Hill Publishers, (2009)
3. V.Mittle“ Basic Electrical Engineering”, Tata McGraw Hill Publishers, (2017)
4. Nagrath. I.J, “Electronics: Analog and Digital”, Prentice Hall India Pvt. Ltd., (2013)

## THANK YOU